

ABSTRACT

An ultra thin film with very low electrical resistance is produced by forming a substrate of a substrate material which forms a metastable bond and depositing a conducting film on the substrate in a vacuum environment in which a base pressure is reduced to a value below 10^{-5} Torr. The film is a metal, metallic alloy, or multilayered film which includes at least one metallic layer. A 0.1 nm thick manganese film deposited in this way on a germanium substrate has a resistivity which at room temperature is lower than the resistivity of metal films of aluminum and copper with the same thickness prepared the same way.